

NASA Ames Research Center wins funding for innovative technology partnerships

STATUS REPORT

Date Released: Sunday, January 14, 2007

Source: [Ames Research Center](#)

NASA's Vision for Space Exploration calls for robots and humans to return to the moon, Mars and beyond. And NASA Ames' innovative partnerships with industry and academia will ensure cost-effective development of the breakthrough technologies needed. Responding to a call from the NASA Headquarters' Innovative Partnerships Program (IPP), Ames and its collaborators recently submitted eight proposals for seed fund consideration. On the basis of technical merit, feasibility and leveraging of internal and external resources, Ames' proposals were selected for award in four technically diverse areas encompassing the Science, Exploration Systems, Space Operations and Aeronautics mission directorates.

"It is a tribute to our researchers that four of our eight proposals were selected for funding," said Ames Center Director S. Pete Worden. "The quality of the proposals was uniformly high and reflected extremely well upon the entire Ames scientific and research community. At Ames, we are charting new strategic directions and ensuring that we will be a critical player as NASA implements its Vision." In response to the IPP seed fund call, the Ames Technology Partnerships Office received 32 proposals. These were narrowed to eight based on the headquarters-established criteria that proposals had to be directly relevant to mission directorate technology priorities and had to demonstrate a substantial leveraging of external resources. The winning Ames proposals will provide critical support to multiple missions in a highly cost-effective manner.

One such proposal studies the development of an innovative multimission telescope that uses large, lightweight silicon carbide mirrors in space. The proposed telescope would lower mission costs by using low-cost silicon carbide mirrors, and their light weight would reduce the spacecraft's cargo weight. Its field of vision can be wide or narrow, and is capable of detection, observation and characterization of various phenomena. Several innovative partnerships will be leveraged to develop this technology -General Dynamics Advanced Information Systems, the Air Force Research Laboratory and Subaru.


For the astronauts to exist on the moon, they will use lunar resources to Ames wins funding for innovative technology partnerships possibly make oxygen and water, create radiation shielding and building materials. Ames proposed equipping small rovers (25 to 50 kg in mass) with sensors for surface prospecting. These small robots identify and map key resources such as water ice and minerals for oxygen production. This project leverages the Ball Aerospace Inc. and the University of Tennessee for their sensor development experience. Specifically, the University of Tennessee will provide a compact neutron spectrometer for the detection of near-surface water (liquid and ice), and Ball Aerospace will provide a volatile water extraction and purification system from regolith analog samples.

Sorties to the moon would hone astronaut skills and appraise equipment. For the success of this experiment, ground control would need the skill to support outposts

on the moon. The third proposal characterizes the technical parameters for lunar communications between the Earth and the moon, focusing on the Internet protocol (IP) network, laser communications and small satellites. Three recommendations from NASA's 2006 Space Communications Architecture Working Group will be studied: 1. schedule and planning; 2. network services, and protocol selection and governance; and 3. lunar communications.

The key benefit to NASA is the development of a network solution for lunar communications and navigation that supports future missions with low-cost connectivity, while leveraging the best solutions from the telecommunications industry. Partners include Ball Aerospace, which will provide access to its internal spacecraft hardware development activities; and Cisco, which will provide networking protocols and support integration of the IP network functions into existing spacecraft communications.

The last proposal improves the Integrated Systems Health Management techniques and processes for avionics systems, which promises to boost in-flight performance, reduce maintenance costs, and improve aircraft reliability. Its application is relevant to multiple Exploration Systems Mission Directorate vehicles, including Orion, Ares, and future vehicles such as LSAM. The partner is Impact Technologies, which will provide its experience with prognostics for electronics.

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